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JANUARY 1, 1974-MARCH 31, 1974

R. J. Rummel

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(3) a consolidation of the theoretical-empirical results of DON in book form (Field Theory Evolving);

(4) and a selection and test of international social indicators spanning the above results.

Moreover, a renewal proposal to ARPA and a new proposal to NSF to collect historical data on our international social indicators were prepared and submitted. Finally, two books were completed (Field Theory Evolving and The Dynamic Psychological Field: A Psycho-Philosophical Preface to the Dynamics of Violence and War and are in press (Sage Publications).

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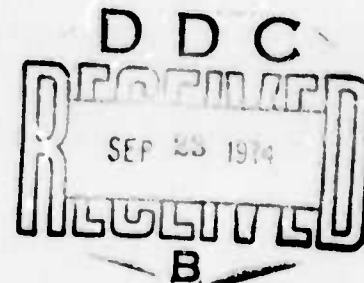
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THE DIMENSIONALITY OF NATIONS PROJECT

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ABSTRACT

During the quarter, the following were completed:

(1) an analysis of 1963 U.S. foreign behavior towards all nations, which found the dimensions well accounted for by attribute distances, especially that involving power (these results were in line with findings for China and the U.S.S.R.);

(2) an analysis of random data and distances, which indicated that our empirical results showing that about fifty percent of dyadic nation behavior is explained by distances could not be accounted for by chance;

(3) a consolidation of the theoretical-empirical results of DON in book form (Field Theory Evolving);

(4) and a selection and test of international social indicators spanning the above results.

Moreover, a renewal proposal to ARPA and a new proposal to NSF to collect historical data on our international social indicators were prepared and submitted. Finally, two books were completed (Field Theory Evolving and The Dynamic Psychological Field: A Psycho-Philosophical Preface to the Dynamics of Violence and War and are in press (Sage Publications).

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INTRODUCTION

This third quarterly report is divided into seven sections. The first describes the analyses initiated and completed during the quarter; the results of special significance are highlighted. Methodological problems faced during the analyses along with any computer programs that have been written or revised during the quarter are discussed in the second section. In this and the previous section, technical terms and discussions are avoided where possible. The third section describes the data collections begun and completed during the quarter. Current personnel and personnel commitments made are discussed in the fifth section and the sixth section covers project publications, research reports and monographs in preparation and completed. The final section delineates changes in the DON budget, status of subcontracts, and expenditures to date.

I. ANALYSES

1.1 The 1963 Foreign Relations of the U.S. A variety of measures of the dyadic interaction of the U.S. with all other nations for 1963 were analyzed to determine the dimensions of U.S. behavior. Five major independent dimensions were found; they involved transactions, alliances, negative communications, aid, military violence, and UN voting.

A question was then the degree to which U.S. behavior towards other nations along these dimensions was a function of their socio-economic and political distances from the U.S. A canonical analysis showed that about half of the variance in U.S. behavior can be explained by such distances. Moreover, we determined equations (with evaluated parameters) explicitly relating particular behavioral dimensions, such as alliances and transactions, to specific distances, such as political, economic and power dimensions.

These results further confirm the role of distances in international relations and the reliability of particular equations found for the U.S. for 1955, 1960 and 1965; for China for 1955 and 1963, and for the U.S.S.R. for 1960 and 1965.<sup>1</sup>

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<sup>1</sup>These results have been reported in past quarterly reports for this and the previous ARPA Contract No. N00014-67-A-0387-0003. All these results, including those for the U.S. in 1963, are presented in Field Theory Evolving, mentioned in Section 6.1, below.



1.2 Random Data Runs. In a previous quarterly report, our time series analyses of the relationship between dyadic international behavior and distances were presented. We then reported that about fifty percent of the variance in all dyadic behavior could be explained, and that some equations accounting for over ninety percent of the variance were determined. Finally, the significance levels (using an appropriate statistic) of these results were high, some for which the odds of being chance findings are over a billion to one.

However, these tests not the results may have been forced by some dependencies in our data or constraints in the method used. To assess this, we replaced all our behavior data for each of fourteen samples of dyads, 1950-1965, with random numbers and reran the whole analysis.

The results confirm the meaningfulness of distances. For real behavior data, distances accounted for an average of forty-nine percent of the variance in behavior; for random numbers, the average dropped to thirteen percent. Moreover, for the random data, the best equation that could be found to fit specific random numbers and distances accounted for about fifty percent of the random variance; while for real behavior data, the best equation explained ninety-six percent of the variance.

1.3 Consolidating the 1950-65 findings. The above results, in addition to the substantive findings on (a) the 1950-65 dimensions of national attributes, (b) of dyadic behavior, and (c) of the linkages between distances and behavior, were consolidated and summarized in a 25-page chapter, "International Linkages, 1950-65," for Field Theory Evolving (see Section 6.1, below). In addition, the best equations linking distances and behavior and the groups of dyads manifesting similar equations were presented. Thus, this chapter contains the major findings of DON over the last five years.

1.4 International Social Indicators, 1950-1965. Unfortunately, the above results are abstract, based as they are on complex analyses and factor scores. Accordingly, we intend to redo the analyses and simplify the presentation using indicators. Through numerous meetings of project staff, a best set of such indicators of international behavior and national dimensions was determined. These were then intercorrelated to assess their independence, and were found to represent the variances partitioned and interrelated in the above comprehensive analyses (see also Section 4.1.1, below).

1.5 Assessing DON's Findings. A systematic analysis and consolidation of a decade of all DON's findings on the relationship between distances and international behavior was undertaken and completed during the quarter. The conclusions were presented as the final chapter to Field Theory Evolving (see Section 6.1), and can be put into a series of very general propositions.<sup>2</sup>

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<sup>2</sup>There is a wealth of quantitative detail and mathematical functions underlying each proposition. Although put in general terms, therefore, they can be given great specificity, as required.

- 1) International relations is highly structured into clear and meaningful patterns of nation attributes and dyadic behavior.
- 2) The three dominant patterns of attributes comprise wealth, power and ideology; the dominant patterns of dyadic behavior are transactions, alignment, international organizations and negative communications.
- 3) About half of the variation in a nation's patterned dyadic behavior is accounted for by its similarities and differences (distances) from the object nation. The particular function relating an actor's dyadic behavior to such distances is  $w = \lambda ad$ , where  $w$  is the patterned behavior,  $d$  is a particular distance (vector) on one of the attribute patterns, and  $a$  is a parameter specific to the actor.
- 4) Although all actors are similarly affected by distances in total, which distances relate to which behavior depends on the actor. That is, parameters generally vary by actor.
- 5) Although overall distances account for about fifty percent of the actor's patterns dyadic behavior, some particular distance relationship explain about eighty to ninety percent of their variation in such behavior.
- 6) One of the best and most consistent linkages is between the power of the object nation and the cooperation plus conflict of the actor towards it. Generally, the conflict between nations is a function of their power parity and their cooperation. The higher the power of the object nation and the less the cooperation with it, the higher the conflict behavior towards it.

## II. METHODOLOGY AND COMPUTER PROGRAMS

The Effect of Joint Zeros on Correlations. Projected correlational analyses will involve data containing thousands of cases of joint zeros (e.g., lack of threats or military action between two nations). To avoid the task of detailing these zeros, a mathematical analysis was done to determine a function involving the correlation between non-zero data and the number of added joint zeros. Such a function was determined, from which it was deduced that (a) adding zeros changes the correlation and (b) the effect of the zeros depends on the sign of the covariance between the nonzero data. The conclusion is that no easy road exists to dealing with zero data, but that they must be included in the analysis along with the nonzero values.

## III. DATA

There were no new data developments to report this quarter.



#### IV. PERSONNEL

4.1 Project Director. During this quarter, the project director was involved in a number of activities, as follows.

4.1.1 NSF Proposal. An NSF proposal was submitted by the director to refine and extend the data on the national social indicators DON had developed (see Section 1.4, above). Three steps were proposed. First, data collection on these social indicators would be extended back to 1820. Second, the adequacy of the set of indicators would be assessed using the same research design which generated the initial set of indicators. Indicators would then be replaced as indicated. And third, the linkages between the behavioral indicators (which are of alignment, conflict, violence, and so on) with differences on power, wealth and political indicators.

4.1.2 ARPA Proposal. A renewal proposal was submitted to ARPA by the director to continue DON with a same-level budget for the second year under the five-year research plan approved in 1973.

4.1.3 National Attributes and Behavior. The director began writing the book (tentatively titled National Attributes and Behavior: Data, Dimensions, Groups and Linkages) which will present in detail the findings on the 1950-1965 dimensions and linkages of nations. This book will also make available all the attribute and behavior data collected for these analyses.

4.1.4 International Studies Association Presentations. The director participated in two events focused on DON at the St. Louis International Studies Association (ISA) Convention. First, there was a panel devoted to critiques of DON's decade of research, and the director was the panel discussant. Second, there was an evening set aside in the Convention program for meeting and questioning DON's director. Both events were well attended and received enthusiastic response.

4.1.5 Teaching. During the quarter the director has been teaching a course in Quantitative Political Thought. This is a course dealing with the philosophical nature and substantive meaning of mathematics applied to politics.

4.1.6 Research Council. As a member of the University Research Council, the director has been involved in evaluating a variety of research proposals submitted for funding by university and extramural funds.

4.2 Research Assistants. In order to participate in the DON-oriented events at the ISA Convention, Jack Omen, Edward Schwerin and Peter Sybinsky attended the Convention with the director. Through discussions with Professor Robert North, Jack Omen was able to link his proposed dissertation on international conflict to the work of North at Stanford and Professor Nazli Choucri at M.I.T.

## V. DON ACTIVITIES

5.1 Staff Meetings. Two-hour weekly meetings were held on a variety of research topics, ranging from the NSF proposal and best international social indicators to the various forms of power and political behavior.

5.2 Reading Group Meetings. Two-hour weekly meetings were continued throughout the quarter as a way of acquainting project staff with the fundamental research and scholarly literature related to our efforts.

## VI. PUBLICATIONS AND REPORTS

6.1 Books. Two books were completed and were submitted to Sage Publications. The first is The Dynamic Psychological Field: A Psycho-Philosophical Preface to the Dynamics of Violence and War, and presents our major analyses of the psychological foundation of conflict. The other book is Field Theory Evolving: A Developing View of the Mathematical and Empirical Space of Nations. This presents and analyzes all the theoretical-empirical work of DON (see Sections 1.1, 1.3, 1.5, above).

6.2 Manuscripts. Work on The Sociological Field has continued during the quarter. Moreover, writing was begun on National Attributes and Behavior (see Section 4.1.3, above).

## VII. BUDGET

7.1 At the conclusion of this quarter, the expenditures of DON were in line with those budgeted.

7.2 Amount Funded. The maximum amount available for reimbursement is \$50,000.00.

7.3 Estimated Expenditures and Commitments. Total expenditures to date (07-01-73 to 03-31-74): \$34,033.52. Total estimated expenditures (07-01-73 through 06-30-74): \$50,000.00.

7.4 Estimated Additional Funds Required. None. All funds have been or will be expended under the contract.